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<u>Method of calling a substation by a central station in a transmission system</u>

The invention relates to a method of calling a substation by a central station in a transmission system as set forth in the classifying portion of claim 1.

10   The method is preferably used in a transmission system which serves for the remote reading of electricity meters.

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US No 5 390 360 sets forth a method of acquiring access rights to a communication channel in a radio frequency communication system, wherein a first
5   unit interrogates a plurality of second units. The first unit receives a command to start the interrogation cycle by way of a communication channel. The first unit then selects a time delay from a group of time delays and transmits in series, when the channel is free, at the end of the selected time delay, an interrogation request at least to all second units of a subgroup from the plurality of second units.

10   The English Abstract of JP 10051473 A discloses a communication system in which a master station communicates with a plurality of slave stations by way of a two-way communication path.

        EP 581 073 A1 is concerned with a cordless telephone system in which one channel out of a plurality of channels is selected and wherein that selected channel
15   is used for the transmission and reception of speech data in a timesharing mode.

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The object of the invention is to provide a method of the kind set forth hereinbefore, which permits optimum, parallel and synchronous utilisation of all available communication means for a group of substations so that a central station,
5 by way of communication channels of that group, detects simultaneously and in an optimum fashion data and in particular measurement data of electricity meters, of all associated substations.

In accordance with the invention the specified object is attained by the features recited in the characterising portion of claim 1. Advantageous
10 embodiments of the invention are set forth in the appendant claims.

An embodiment of the invention is described in greater detail hereinafter and illustrated in the drawing in which:

Figure 1 is a diagrammatic view of a transmission system, and

Figure 2 shows a flow chart for data acquisition.

15 A transmission system diagrammatically shown in Figure 1 comprises a central station Z which is connected to substations by way of a plurality of communication channels. The transmission system serves preferably for remote reading of electricity meters which belong to the substations and are connected thereto. The central station Z must be capable of simultaneously actuating a
20 plurality of communication channels in order to acquire the data of the substations in parallel relationship. The central station Z includes hardware HW, an operating system BS and application software ASW (user software). The hardware HW is connected to the substations by way of the plurality of communication channels. As the individual substations have different communication parameters such as
25 transmission mode, control sign and so forth, in accordance with the invention the individual communication channels are combined to form communication groups. The plurality of the communication channels is thus subdivided into communication groups involving the same property or identical parameter values. In that case each communication channel of a communication group is so selected that it has
30 the same communication parameters as the other communication channels of the communication group. As already mentioned such a parameter is

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the transmission mode, for example a half-duplex or full duplex mode. The communication channels of the same communication group then involve the same

5   transmission mode. It is assumed in Figure 1 that there are three communications groups GRI, GRII and GRIII, wherein for example the communication group GRI has four communication channels, the communication group GRII has n communication channels and the communication group GRIII has three communication channels. When defining a substation, a communication group

10   which has the communication parameters which are applicable in respect of that substation is associated with that substation. By way of the communication channels of that communication group, the central station Z can acquire the data, for example measurement data of the electricity meters, of the substations in question. That permits optimum, parallel and synchronous utilisation of all

15   available communication means for a communication group of substations. For reasons of simplicity of the drawing, Figure 1 shows only a single substation US_m which is connected to the m-th communication channel of the communication group GRII.

The method according to the invention of calling a substation, for example

20   US_m, by the central station Z of the transmission system for the purposes of information transmission by way of a communication channel, for example m, which was called from the plurality of the communication channels, provides that, within a selected communication group, for example GRII, which has the desired properties or parameter values, a communication channel m is called, which is still

25   communication-free. If all n communication channels of the communication group GRII in question are already busy, the central station Z goes into a waiting condition until at least one of the communication channels of the communication group GRII in question is communication-free. For that purpose, each communication group GRI, GRII and GRIII of the communication channels

30   preferably has its own code word, for example as an address, associated therewith. When a communication channel is busy with a communication, an item of busy information is stored in the central station Z, from which the central station Z recognises that the communication channel in question is already busy. Storage of the item of busy information preferably involves setting a flag or storing a code

35   word in a memory of the central station Z. In that case the item of busy information is stored in the operating system BS in the central station Z or in the application software ASW in the central station Z.

Acquisition of the data of the substations by the central station Z takes place in accordance with the flow chart shown in Figure 2. It includes 6 functional

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blocks 10 to 11 and 13 to 16 and a decision block 12 which are connected in series in the sequence of their numbering. The functions A, B, C, D, E, F or G are associated in the specified sequence with the blocks 10 to 16, wherein the functions involve the following significances:

A   start of a data acquisition of a given substation,

B   reading of the designation of the associated communication group,

C   questioning whether a communication channel of that communication group is free or not free,

D   occupying a free communication channel,

E   acquiring the data,

F   releasing the communication channel used for communication purposes, and

G   end of data acquisition.

The decision block 12 has a yes-output identified by Y ('yes') and a no-output identified by (N 'no'), the latter being connected to the input of the decision block 12 while the former is taken to the input of the next function block 13 of the series arrangement.

After a start of the data acquisition procedure in accordance with function block 10, then in accordance with function block 11 the communication group belonging to the substations whose data are to be acquired is selected and then in accordance with decision block 12 it is clarified whether one of the communication channels of the communication group in question is still free or is not free. In the latter case the program goes back to the input of the decision block 12 again and executes the latter until one of those communication channels is free. When the latter is the case, the program goes to the function block 13 and occupies the free communication channel with the data acquisition procedure which takes place as indicated by function block 14. After the conclusion thereof the communication channel is freed again as indicated by the function block 15, whereby the transmission is then terminated as indicated by the function block 16.